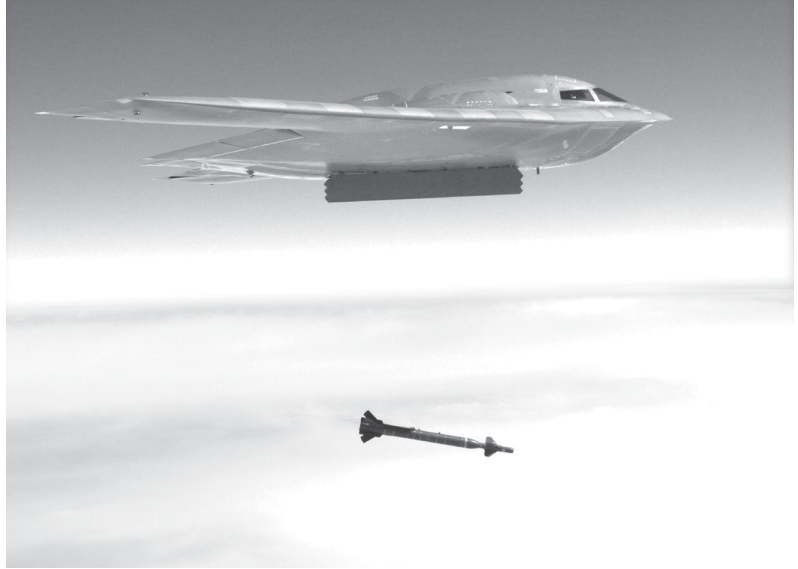


AIR FORCE PROGRAMS

B-2

SUMMARY

- DOT&E approved the Test and Evaluation Master Plan, which covers the B-2 and the B-2 Radar Modernization Program, in May 2004.
- Operational test and evaluation confirmed that:
 - Improvements to B-2 materials, such as a new primer/sealer as well as the re-design of a seam around the engine bay doors, should improve future mission capable rates.
 - The SCI-2K system appears to improve upon the low observable (LO) Combat Readiness Model's ability to confirm B-2 LO combat readiness.
 - Satellite communications capability and VHF radio upgrades are effective and suitable. However, transmit/receive capability of VHF frequencies is very broad and may not be suitable for peacetime use outside the continental United States.
 - Employment of the B-2 with the 5,000-pound GBU-28B/B GPS-guided weapon is effective and suitable for combat. Testing of the weapon in an operational scenario using off-board lasing is required to confirm full functionality.
- The Defensive Management System now provides adequate situational awareness to avoid pop-up threats, but only in less dense threat environments.
- A beyond line-of-sight capability to monitor LINK-16 transmissions prior to B-2 arrival in the theater of combat operations is not effective or suitable.
- Aircraft operational flight program software updates to enable compensation for wind effects on the aircraft when in turns and to rectify targeting coordinate round-off errors are effective and suitable.
- Developmental testing under the B-2 Radar Modernization Program continues to make progress. Milestone B occurred in August 2004.



Initial operational testing of advanced high-frequency materials on the B-2 should conclude in FY05. The B-2 is effective and suitable when employing the 500-pound JDAM or the 5,000-pound, GPS-guided GBU-28B/B. Employment with the JASSM, however, is not resolved.

SYSTEM DESCRIPTION AND MISSION

The B-2, produced by Northrop Grumman, is a multi-role, LO bomber capable of delivering conventional and nuclear munitions. It has four turbofan engines and twin side-by-side weapons bays. System avionics include a multi-mode radar, Global Positioning System-aided navigation, a Defensive Management System for radar warning functions, and a Terrain Following/Terrain Avoidance system. The bomber's current principal weapon is the 2,000-pound Joint Direct Attack Munition (JDAM).

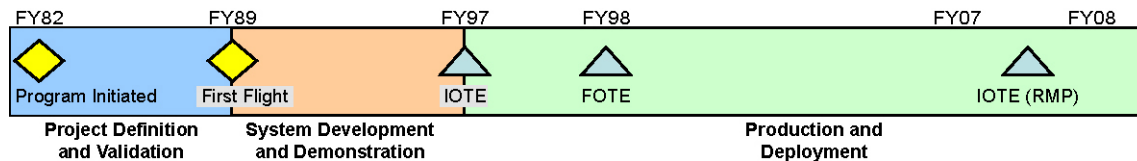
The basic aircraft continues to undergo multiple modifications, some of which are aimed at correcting deficiencies in the original aircraft design, while others are intended to enhance capability and improve the aircraft's operational effectiveness and suitability. Planned modifications for FY04 and beyond include addition of an extremely high-frequency satellite communication system, upgrades to the Defensive Management System, advances in LO materials,

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Link-16 integration, weapon integration, and periodic software upgrades. Weapons being added include the Enhanced GBU-28 (GBU-28B/B) 5,000-pound GPS-guided weapon, the AGM-158A Joint Air-to-Surface Stand-off Missile (JASSM), and the 500-pound variant of the JDAM (GBU-38).

The B-2 radar requires an upgrade called the Radar Modernization Program (RMP) to move the radar to a new operating frequency. This upgrade is necessary to avoid interference with primary authorized users of the current B-2 radar frequency. The RMP will feature an active electronically scanned array and is scheduled to undergo IOT&E in FY07. The B-2 was employed in combat operations during Operation Allied Force (March through May 1999), Operation Enduring Freedom (October 2001), and Operation Iraqi Freedom (March through April 2003).

TEST AND EVALUATION ACTIVITY



FY04 operational test efforts focused on:

- Integration of the B-2 with the AGM-158A, GBU-28B/B, and the GBU-38.
- A new integrated aircraft radio system that enables UHF/VHF, satellite communication, and Have Quick II anti-jam operations.
- Updates to the Defensive Management System.
- The ability to calculate the effects of winds during turns.
- Improvements to rectify targeting coordinate round-off errors.

New systems operationally tested during FY04 also include:

- A beyond line-of-sight capability to monitor LINK-16 transmissions prior to combat arrival in theater.
- A flightline system (SCI-2K) using the radar from the CLOVerS system to facilitate determination of B-2 radar cross-section readiness for combat.
- Continued evaluation of sustainment upgrades to low-observable materials on the aircraft.

Development of the new B-2 radar continues. Developmental testing in FY04 consisted of corrosion, thermal stress, and mechanical stress testing to transmit/receive module housings. Developmental testing on a subset of a full radar transmit and receive module array also occurred in FY04.

The B-2 program is not under formal oversight for LFT&E. However, upgrades or modifications to the B-2 may alter aircraft baseline susceptibility. IOT&E of any modification will assess whether alteration to susceptibility occurs.

TEST AND EVALUATION ASSESSMENT

Review of shortfalls identified during initial and follow-on operational testing confirms:

- Overall mission capable rate can be sustained at levels well above requirement.
- The Defensive Management System now provides adequate situational awareness to avoid pop-up threats, but only in less dense threat environments.
- In a robust threat environment, the Defensive Management System cannot provide adequate situational awareness without increased system processing capability.

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Review of operational testing in FY04 confirms the effectiveness and suitability of:

- A new primer/sealer, intended to mitigate fluid migration into areas that cause additional LO maintenance activity.
- Aircraft operational flight program software updates, which provide an ability to compensate for wind effects on the aircraft when in turns and to rectify targeting coordinate round-off errors.
- A new satellite communications capability and VHF radio upgrade. However:
 - The system is one-of-a-kind and is not Joint Tactical Radio System-compliant.
 - Side tone returns of the VHF system also possess an irritatingly tinny ring to the crew.
 - Transmit/receive bandwidth of VHF frequencies is very broad and may not be suitable for peacetime use outside the continental United States.
- Weapons employment.
 - The GBU-28B/B and the GBU-38 meet user specified criteria when integrated on the B-2.
 - Employment of the GBU-38 with the Joint Programmable Fuze also meets user specified criteria.
 - B-2 fielded weapons employment effectiveness remains undiminished.
 - However, confirmation of GBU-28B/B functionality when employed by the B-2 during off-board lasing operations still requires operational testing, scheduled for FY05.

Review of operational testing in FY04 confirms that the beyond line-of-sight capability to monitor LINK-16 transmissions prior to B-2 arrival in the theater of combat operations is not effective or suitable. The system suffers from interoperability and interface shortfalls with theater gateways such as Joint Range Extension and the Roll-on Beyond line-of-sight Extension system.

Review of operational testing to conclude in FY05 indicates:

- The re-design of a seam around the nozzle bay door, intended to reduce LO maintenance activity, may meet requirements.
- The SCI-2K system may improve upon the ability of flight-line maintenance to determine the LO combat readiness of the B-2. Operational testing through FY04 indicates that LO combat readiness of a B-2 can be accurately determined 50 percent of the time with the SCI-2K, as compared to the LO Combat Readiness Model's ability of 17 percent.
- B-2 employment with the JASSM is unresolved.
 - Two missions resulted in the launch of only one weapon, which fell short of the target upon transition to the terminal phase of flight.
 - While interface with the weapon appears suitable, determination of B-2 effectiveness when employing JASSM is dependent on the results of two remaining JASSM shots.

Review of developmental testing of the B-2 RMP through FY04 reveals:

- Corrosion, thermal stress, and mechanical stress of transmit/receive module housings resulted in no degradation to housing integrity or performance.
- Manufacturing of transmit/receive modules validates the production process.
- A subset of the transmit and receive module array demonstrates transmit and receive parameters as anticipated for this stage of development.

